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EXAMINER	
WILLIAMS, LAWRENCE B	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

9/1

Office Action Summary	Application No.	Applicant(s)	
	09/965,242	RAGHAVAN ET AL.	
	Examiner	**Art Unit**	
	Lawrence B. Williams	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 08 November 2007.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 7-45 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-9,11-17,23-25,28,29,32-39 and 41-45 is/are rejected.

7)☒ Claim(s) 10, 18-22,26-17, 30, 31, 40 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 08 November have been fully considered but they are not persuasive. Applicant argues that there is no need for the data from each of the N subscriber lines to be synchronized. The examiner respectfully disagrees. McHale et al. teaches the communications server (58) of Fig. 1, Fig. 13A, may detect frames or packets including HDLC. HDLC (high-level data link control) is a superset of SDLC (synchronous data link control). Thus the data would be synchronized. McHale et al. also discloses the communications server connected to a communications network (64) which may also include a synchronous optical network (col. 6, lines 25-39). This necessarily indicates, in itself a synchronous system. McHale also discloses the communications network may include a frame relay network, T1, T3, E1, or E3 all which require synchronization at both ends of the transmission channel. Therefore being connected to these types of networks would obviously require that the data be synchronized.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 7, 38, 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over McHale et al. (US Patent 5,781,617) in view of Wang (US Patent 5,822,368).

(1) With regard to claim 7, McHale et al. discloses in Fig. 13A, a serial/deserializer transmission system, comprising: a plurality of demodulators (elements 644), each of the plurality of demodulators receiving signals from one of a plurality of transmission bands (McHale et al. discloses the signal from mixer (642) is a combined signal of frequencies f1-fn, col. 20, lines 16-26) are that are transmitted on a single electrically differential conductive pair (col. 1, line 65-col. 2, line 1, Fig. 11A discloses a differential receiver. Thus the transmission line from the mixer is a single electrically differential pair). McHale et al. discloses the demodulators (644) demodulating the combined signal at one of the frequencies f1-fn provided by a corresponding modulator (638) and providing the demodulated signal to an associated modem (col. 20, lines 25); wherein the plurality of demodulators recover data synchronously distributed across the plurality of transmission bands in the serial/deserializer transmission system (As noted above, McHale et al. teaches the communications server (58) of Fig. 1, Fig. 13A, may detect frames or packets including HDLC. HDLC (high-level data link control) is a superset of SDLC (synchronous data link control). Thus the data would be synchronized. McHale et al. also discloses the communications server connected to a communications network (64) which may also include a synchronous optical network (col. 6, lines 25-39). This necessarily indicates, in itself a synchronous system. McHale also discloses the communications network may include a frame relay network, T1, T3, E1, or E3 all which require synchronization at both ends of the transmission channel. Therefore being connected to these types of networks would obviously require that the data be synchronized. McHale et al. does not teach the exact make-up of the demodulator.

However, Wang discloses a demodulator for demodulating a transmitted signal having an analog down-converter (Fig. 5, element 510), a filter (Fig. 5, element 590), an A/D converter (Fig. 5, element 515), an equalizer (Fig. 5, element 570), and a decoder (Fig. 3, elements 310, 315). Wang discloses the elements of applicant's demodulator and the elements could easily be applied by one skilled in the art in the demodulator of McHale et al. to provide the data transmitted by the corresponding modulator (638).

Therefore, it would have been obvious to one of ordinary skill in the art at the time to provide the elements used by Wang to the demodulator of McHale et al. as a method of providing a demodulated signal of one the multiple frequencies (f1-fn) provided by a corresponding modulator (638) and provide a more reliable transmission system wherein the error rate is reduced.

(2) With regard to, claim 38 discloses the method of the apparatus claim disclosed in claim 7. Therefore a similar rejection as applied to claim 7 applies.

(3) With regard to claim 44, claim 44 inherits all limitations of claim 38. Furthermore Wang also discloses adaptively choosing at least one operating parameter (Fig. 14). Wang teaches the updating of the equalizer dependent upon an initial channel response, which would adaptability dependant upon an initial channel response.

Therefore, it would have been obvious to one of ordinary skill in the art at the time to provide the elements used by Wang to the demodulator of McHale et al. as a method of providing a demodulated signal of one the multiple frequencies (f1-fn) provided by a corresponding modulator (638) and provide a more reliable transmission system wherein the error rate is reduced.

2. Claims 8-9, 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over McHale et al. (US Patent 5,781,617) in view of Wang (US Patent 5,822,368) and further in view of Baker (US Patent 6,163,563).

(1) With regard to claim 8, claim 8 inherits all limitations of claim 7. The modified transmission system of McHale et al. does not explicitly disclose the in-phase signal being an input signal multiplied by a cosine function and the quadrature signal being an input signal multiplied by a sine function. However, such claimed limitations are well known in the art as taught by Baker (col. 4, line 58 - col. 5, line 11).

It would have been obvious to one of ordinary skill in the art at the time to provide such method of Baker to the modified transmission system of McHale et al. to utilize such usefulness of a communication system in equipment employing integrated circuits and provide such advantage of reducing circuitry complexity.

(2) With regard to claim 9, claim 9 inherits all limitations of claim 8. Furthermore, Baker discloses in Fig. 1 an in-phase filter (element 42) and a quadrature filter (element 44).

It would have been obvious to one of ordinary skill in the art at the time to provide such method of Baker to the modified transmission system of McHale et al. to utilize such usefulness of a communication system in equipment employing integrated circuits and provide such advantage of reducing circuitry complexity.

(3) With regard to claim 15, claim 15 inherits all limitations of claim 8. As noted above, McHale et al. in combination with Wang and Baker disclose all limitations of claim 8. Furthermore, Baker also discloses in Fig. 1, wherein the analog-to-digital converter includes a first analog-to-digital converter

(element 46) coupled to received signals from the in-phase filter and a second analog-to-digital converter (element 48) coupled to receive signals from the quadrature filter.

It would have been obvious to one of ordinary skill in the art at the time to provide such method of Baker to the modified transmission system of McHale et al. to utilize such usefulness of a communication system in equipment employing integrated circuits and provide such advantage of reducing circuitry complexity.

(4) With regard to claims 16-17, Baker also discloses a phase correction circuit coupled between the analog-to-digital converter and the equalizer (Fig. 1, elements 34, 36).

3. Claims 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over McHale et al. (US Patent 5,781,617) in view of Wang (US Patent 5,822,368) as applied to claim 9 above, and further in view of Aono et al. (US Patent 5,844,950).

(1) With regard to claim 11, claim 11 inherits all limitations of claim 8 above. As noted above, McHale et al. in combination with Wang disclose all limitations of claim 8. They do not however explicitly disclose the system further including an amplifier coupled between the filter and the analog-to-digital converter, the amplifier amplifying an in-phase filtered signal from the in-phase filter and a quadrature filter signal from the quadrature filter such that the analog-to-digital converter is filled.

However, Aono et al. discloses in Fig. 12, a cross polarization interference canceller wherein he teaches a system including an amplifier coupled between the filter and the analog-to-digital converter (106_1, 106_2) the amplifier (105_1, 105_2) amplifying an in-phase filtered signal

from the in-phase filter and a quadrature filter signal from the quadrature filter such that the analog-to-digital converter is filled (col. 9, line 64- col. 10, line 12).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Aono et al. to increase accuracy of the A/D converter.

(2) With regard to claim 12, Aono et al. also discloses in Fig. 12, wherein an in-phase gain (105_1) of the amplifier and the quadrature gain of the amplifier (105_2) are adaptively chosen in an automatic gain controller.

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Aono et al. to increase accuracy of the system.

(3) With regard to claim 13, Aono et al. also discloses in Fig. 12, wherein the automatic gain controller sets the in-phase gain and the quadrature gain based on the digitized signals from the analog to digital converters (col. 9, line 64 - col. 10, line 12).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Aono et al. to increase accuracy of the system.

(4) With regard to claim 14, though, Aono et al. does not explicitly teach wherein the in-phase and the quadrature gain are equal, it would be inherent that the gains could be equal if the feedback system determines that the dc offsets of both the in-phase and quadrature signals are equal.

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Aono et al. to increase accuracy of the system.

4. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over McHale et al.

(US Patent 5781,617) in view of Wang (US Patent 5,822,368) as applied to claim 8 above, and further in view of LeFever (US Patent 4,599,732).

As noted above, McHale et al. in combination with Wang disclose all limitations of claim 8 above. They do not however disclose wherein a phase rotator circuit is coupled between the analog-to-digital converter and the equalizer.

However, LeFever discloses in Fig. 2, a technique for acquiring timing and frequency synchronization in which he teaches a receiver wherein a phase rotator circuit (38) is coupled between an analog-to-digital converter (31) and an equalizer (34).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of LeFever to perform instantaneous phase corrections (col. 5, lines 12-28).

5. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over McHale et al. (US Patent 5,781,617) in combination with Wang (US Patent 5,822,368) in view of LeFever (US Patent 4,599,732) as applied to claim 23, and further in view of Leyonhjelm et al. (US Patent 6,351,677 B1).

As noted above, the combination of McHale et al., Wang and LeFever disclose all limitations of claim 23 above. They do not however disclose wherein a parameter of the phase rotator circuit is adaptively chosen. However, Leyonhjelm et al. discloses a wherein a parameter of a phase rotator circuit is adaptively chosen (col. 9, lines 23-35).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings Leyonhjelm et al. as a method of phase aligning the in phase and quadrature signals.

6. Claims 25, 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over McHale et al. (US Patent 5,781,617) in view of Wang (US Patent 5,822,368) as applied to claim 8 above, and further in view of Sasaki (US Patent 6,121,828).

(1) With regard to claim 25, claim 25 inherits all limitations of claim 8 above. As noted above, McHale et al. in combination with Wang disclose all limitations of claim 8. They do not however disclose wherein an amplifier is coupled between the equalizer and the decoder.

However, Sasaki discloses in Fig. 3, a demodulator wherein he teaches an amplifier (81, 82) coupled after an equalizer (70; the decoder though not shown would be inherent for the demodulator).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Sasaki as a method of maintaining an average power output of the signals.

(2) With regard to claim 28, Sasaki also discloses wherein an in-phase gain and a quadrature gain of the amplifier are adaptively chosen from error signals calculated from sliced values (col. 4, line 60- col. 5, line 4).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Sasaki as a method of maintaining an average power output of the signals.

(3) With regard to claim 29, Sasaki also discloses wherein the sliced values are determined from input signals (Fig. 3, output signals 6, 7) to the decoder (Again, though not disclosed, the decoder is inherent in the system).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Sasaki as a method of maintaining an average power output of the signals.

4. Claims 32-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over McHale et al. (US Patent 5,781,617) in view of Wang (US Patent 5,822,368) and further in view of Perlow (US Patent 6,351,293 B1).

(1) With regard to claim 32, claim 32 inherits all limitations of claim 7, above. As noted above, McHale et al. in combination with Wang disclose all limitations of claim 7, above. They do not however disclose wherein the equalizer is a complex equalizer executing a transfer function, the transfer function having parameters $C_k^x(j)$ and $C_k^y(j)$ where j is an integer.

However, Perlow discloses in Fig. 2, a decision directed phase detector wherein he teaches a complex equalizer executing a transfer function. Though Perlow is silent as to the parameters of the transfer function, it is well known in the art that there would be various parameters in the implementation of the equalizer (transfer function, taps, weights, coefficients, etc.) and it would be a mere design choice to designate coefficients for these parameters, as applicant has claimed no distinct use for the claimed parameters.

(2) With regard to claims 33-37, the claims constitute a mere design choice of parameter quantities, as applicant has claimed no distinct use for the claimed parameters. Therefore the parameters would not constitute a patentable inventive step.

5. Claim 39, 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over McHale et al. (US Patent 5,781,617) in view of Wang (US Patent 5,822,368) and further in view of Sandberg et al. (US 5,715,280).

(1) With regard to claim 39, claim 39 inherits all limitations of claim 38. As noted,

McHale in combination with Wang disclose all limitations of claim 38. They do not explicitly teach wherein the down-converting the input signal (X(t)) includes: multiplying the input signal by a cosine function at the frequency of the one of the plurality of transmission bands to obtain an in-phase signal; and multiplying the input signal by a sine function at the frequency of the one of the plurality of transmission bands to obtain a quadrature signal, wherein the base band signal includes the in-phase signal and the quadrature signal.

However, Sandberg et al. teaches teach discloses in Fig. 2, wherein the down-converting the input signal (X(t)) includes: multiplying the input signal by a cosine function at the frequency of the one of the plurality of transmission bands to obtain an in-phase signal; and multiplying the input signal by a sine function at the frequency of the one of the plurality of transmission bands to obtain a quadrature signal, wherein the base band signal includes the in-phase signal and the quadrature signal (col. 2, lines 20-26).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Sandberg et al. as a method of allowing each user in a multi-carrier transmission system to decode only the portion of the data stream intended for that particular user (col. 1. line 63 - col. 2, line 3).

(2) With regard to claim 41, Wang et al. also discloses in Fig. 5, adjusting the phase (element 580) between the in-phase signal and the quadrature signal of the baseband signal.

(3) With regard to claim 42, Wang et al. discloses both an in-phase and quadrature correction (element 580-2).

(4) With regard to claim 43, Wang also discloses in Fig. 5, the method of claim 39 including slicing (element, 540) recovered data.

6. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over McHale et al. (US Patent 5,781,617) in view of Wang (US Patent 5,822,368).

McHale et al. discloses in Fig. 13A, a receiver system, comprising: means (644) for receiving an input signal from a single conductive differential pair, the input signal including a plurality of transmission bands (McHale et al. discloses the signal from mixer (642) is a combined signal of frequencies f1-fn, col. 20, lines 16-26) that are transmitted on a single electrically differential conductive pair (col. 1, line 65-col. 2, line 1, Fig. 11A discloses a differential receiver. Thus the transmission line from the mixer is a single electrically differential pair). McHale et al. discloses the demodulators (644) demodulating the combined signal at one of the frequencies f1-fn provided by a corresponding modulator (638) and providing the demodulated signal to an associated modem (col. 20, lines 25), wherein a plurality of bits (col. 19, lines 54-55) that were synchronously transmitted across the plurality of transmission bands is recovered. McHale et al. teaches the communications server (58) of Fig. 1, Fig. 13A, may detect frames or packets including HDLC. HDLC (high-level data link control) is a superset of SDLC (synchronous data link control). Thus the data would be synchronized. McHale et al. also discloses the communications server connected to a communications network (64) which may also include a synchronous optical network (col. 6, lines 25-39). This necessarily indicates, in itself a synchronous system. McHale also discloses the communications network may include a frame relay network, T1, T3, E1, or E3 all which require synchronization at both ends of the transmission channel. Therefore being connected to these types of networks would obviously

require that the data be synchronized. McHale et al. does not teach the exact make-up of the demodulator.

However, Wang discloses a demodulator for demodulating a transmitted signal having means for down-converter (Fig. 5, element 510), means for obtaining a digital signal (Fig. 5, element 515), means for equalizing (Fig. 5, element 570), means for decoding (Fig. 3, elements 310, 315). Wang discloses the elements of applicant's demodulator and the elements could easily be applied by one skilled in the art in the demodulator of McHale et al. to provide the data transmitted by the corresponding modulator (638) coupled to the single conductive differential pair.

Therefore, it would have been obvious to one of ordinary skill in the art at the time to provide the elements used by Wang to the demodulator of McHale et al. as a method of providing a demodulated signal of one the multiple frequencies (f1-fn) provided by a corresponding modulator (638) and provide a more reliable transmission system wherein the error rate is reduced.

Allowable Subject Matter

7. Claims 10, 18-22, 26-27, 30-31, 40 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

3. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence B Williams whose telephone number is 571-272-3037. The examiner can normally be reached on Monday-Friday (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ghayour Mohammad can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lawrence B. Williams

lbw
February 2, 2008

M. G.
MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER